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DANIEL C. ROPER, Secretary
BUREAU OF FISHERIES
FRANK T. BELL, Commissioner

Fishery Circular No. 21

THE STORY OF OYSTERS

By R. H. FIEDLER

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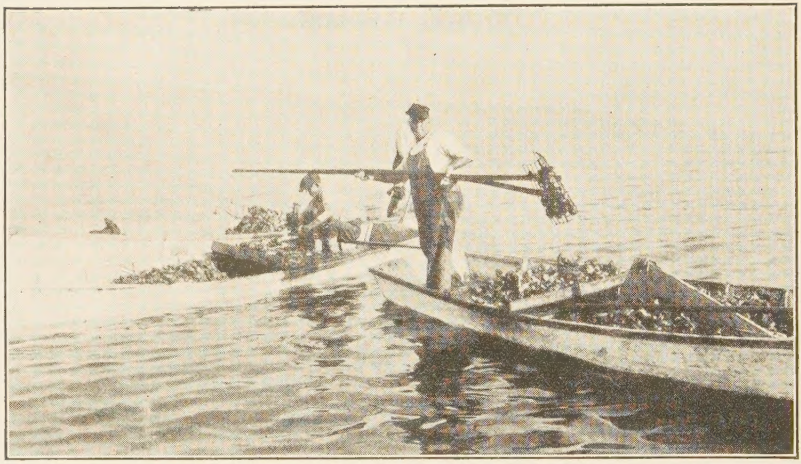

FIGURE 1.—Tonging oysters. Note man on left culling oysters on the "cull" board.

THE STORY OF OYSTERS [1]

By R. H. Fiedler, *Chief, Division of Fishery Industries, United States Bureau of Fisheries*

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Introduction

Nineteen centuries before the Walrus and the Carpenter in Alice in Wonderland [2] made their feast on oysters from the briny deep, the Romans in their banquet halls were singing the praises of oysters in poems,[3] and other Romans were divided among themselves as to which were the best oysters—those which were carried back from Britain by the conquering Roman legions, or those from Lake Lucrinus, the home of the famous Roman oyster.[4] During the Middle Ages, also, the oyster was highly prized as a food. In America, before the arrival of the colonists, the Indians consumed large quantities of this delicacy, as is attested by the huge mounds of oyster shells, often called "kitchen middens", found along the seaboard in some of our Eastern States. One such mound along the Damariscotta

[1] Fishery Circular No. 21. Approved for publication Aug. 19, 1935.
[2] Alice in Wonderland, by Lewis Carroll. Hurst & Co., New York, N. Y.
[3] Fishing from the earliest times, by William Radcliffe. Published by John Murray, London, 1921.
[4] Ibid.

River in Maine is said to contain about 7,000,000 bushels of shells.[5] The American Indians consumed oysters not only in the fresh condition, but they also dried and smoked them for preservation; some of the tribes using dried and smoked oysters for barter.[6]

The early colonists were greatly impressed with the abundance of oysters along our shores and soon this food comprised one of their principal items of diet. In fact, the oyster fishery in New England was prosecuted with such intensity in Colonial times that restrictive measures were imposed as early as 1766 when the Assembly of East Greenwich, R. I., passed an act "forbidding dredging or other methods of taking oysters except tonging."[7] In Maine and New Hampshire overfishing undoubtedly ruined the beds, as now no commercial quantity of oysters is found in the waters of these States.

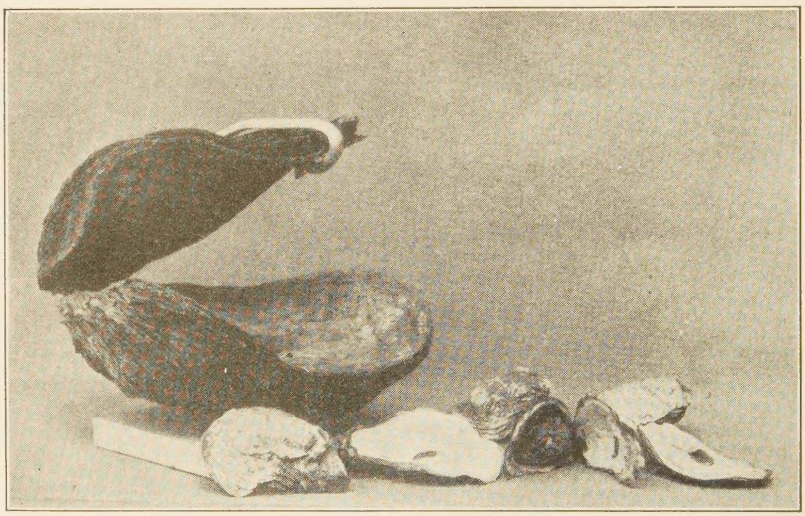

FIGURE 2.—Comparison in size of prehistoric oyster shells (large on left) and modern oyster shells.

At the present time oysters of many species are found along most every seacoast of the world where the water reaches a temperature of 70° F. and above. The principal fisheries are conducted in the United States with France, England, Holland, China, Japan, India, Ireland, and New South Wales following in importance.[8]

In the United States oysters are the most widely distributed sea food taken from our waters, being found in the salt and brackish waters of every State along the Atlantic coast from Massachusetts to Texas, inclusive, and in Washington, Oregon, and California, along the Pacific coast. By far the largest production comes from the Atlantic and Gulf coasts. Our annual harvest of oysters in recent years has amounted to about 11,700,000 bushels, valued at $5,000,000

[5] Oysters: A little of their history and how to cook them, by H. F. Moore. Economic Circular No. 18, revised, U. S. Bureau of Fisheries.

[6] Ibid.

[7] An experimental study in production and collection of seed oysters, by P. S. Galtsoff, H. F. Prytherch, and H. C. McMillin. Fisheries Document No. 1088, U. S. Bureau of Fisheries, Washington, 1930.

[8] The oyster and oyster industry of Maryland, by R. V. Truitt. Conservation Bulletin No. 4. State of Maryland Conservation Department, Baltimore, Md., 1931.

to the fishermen. This quantity yields about 63,000,000 pounds of food,[9] which is about equivalent to the dressed weight of the net production in 1933 of all the sheep and lambs originating on the Atlantic seaboard from the States of Maine to Louisiana, inclusive, and in the State of Washington on the Pacific coast.[10]

Biology of the Oyster [11]

In adult life the oyster usually is attached to some hard object. This may be an oyster shell, either live or empty, or it may be attached to the piling supporting a pier. Some specimens have been found attached to rubber boots, spectacles, lanterns, tile, and other objects which previously have settled to the floor of the sea. Modern science aids the young oyster in its quest for a suitable place of attachment, and has developed various types of collectors for the young oysters, which are called "spat" immediately after attachment. Usually these collectors are of a type which disintegrates as the oyster grows so that single, unattached oysters are obtained. Some collectors are cement and lime-coated brush and cardboard egg crate partitions, while others consist of wire bags containing oyster shells, tiles, and the like. These have been successful in obtaining a better set of spat than under ordinary conditions.

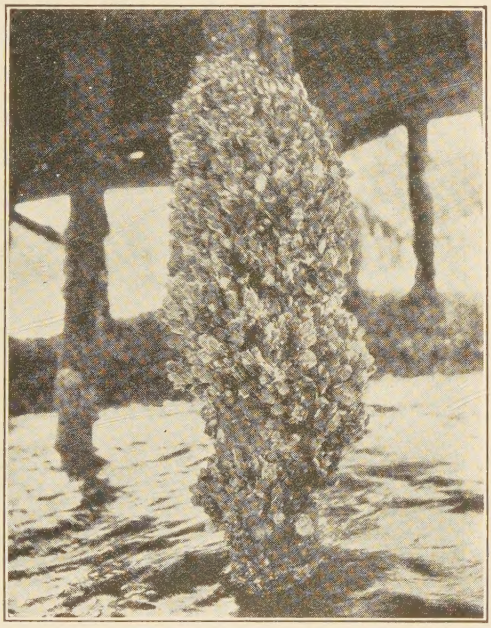

FIGURE 3.—Growth of oysters on piling.

When the water in which the adult oyster lives reaches a temperature of 68° to 70° F., which is about room temperature, spawning takes place. Along the North Atlantic Ocean and on the Pacific coast this may be during the 2 or 3 months of the summer while in the Gulf of Mexico it may last for 6 months, beginning at the end of March.

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[9] Fishery Industries of the U. S. 1934, by R. H. Fiedler. Appendix II, Report Commissioner of Fisheries, 1935.

[10] Farm production and incomes from meat animals, 1930, 1931, 1932, 1933, and 1934. U. S. Department of Agriculture, Washington, 1935.

[11] Based on the following publications: Investigations of the physical conditions controlling spawning of oysters and the occurrence, distribution, and setting of oyster larvae in Milford Harbor, Connecticut, by H. F. Prytherch, Fisheries Document No. 1054, U. S. Bureau of Fisheries, Washington, 1929; An experimental study in production and collection of seed oysters, by P. S. Galtsoff, H. F. Prytherch, and H. C. McMillin, Fisheries Document No. 1088, U. S. Bureau of Fisheries, Washington, 1930; Factors influencing the spawning and setting of oysters in Galveston Bay, Tex., by A. E. Hopkins, Bulletin No. 3, U. S. Bureau of Fisheries, Washington, 1931; and Oyster industry of the Pacific coast of the United States, by Paul S. Galtsoff, Fisheries Document No. 1066, U. S. Bureau of Fisheries, Washington, 1929.

After spawning, the newly born young or larvae is so small that it can barely be seen with the naked human eye. So small is it that, when 1 day old, a bottle about the size of an average man's little finger would hold about 1,000,000 of these young oysters and would produce, if they all matured, about 4,000 bushels of marketable oysters. At this stage it is free swimming, bobbing here and there with the tides and currents, many times being carried far from its place of birth. This free-swimming stage is of short duration varying with the species and water conditions, never exceeding a few weeks, after which the instinct to settle down and build a home pre-

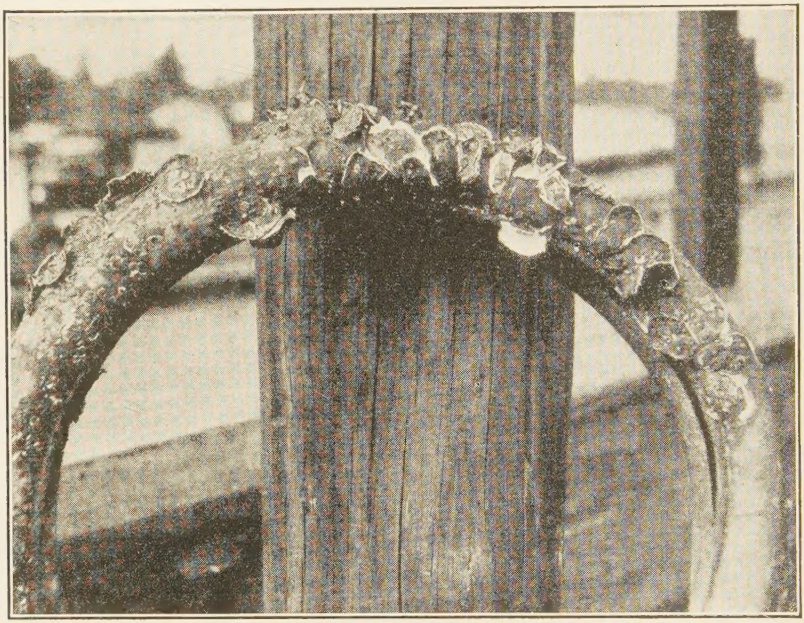

FIGURE 4.—Growth of oysters on rubber tire.

vails. So, when conditions as to temperature and saltiness of the water are favorable, it settles to the bottom to attach itself to an object. However, of the myriads of young oysters which settle to the bottom, only a few are fortunate enough to fall on a firm object with a smooth, clean surface. These fortunate ones then cement themselves to it almost instantly. In this stage as spat, they are plainly visible to the human eye. After the attachment, the oysters remain on the objects, unless in the meantime the object has disintegrated, and grow in from 2 to 4 years into tender, juicy, succulent, marketable oysters, obtaining a length of about 4 to 6 inches. They are then ready for harvesting.

You may wonder how we know the age of the oyster. This can be determined from the successive layers making up its shell. Usually, each pronounced layer represents a year's growth, much as the rings around the circumference of a tree usually indicate a similar passage of time.

Large quantities of water are strained by the oyster for its food, which consists of very minute plants and animals. Imagine your-

self under optimum conditions drinking about 100 quarts of water in 24 hours and you have some idea of how much water passes through the gills of an average oyster during a 24-hour period when the temperature of the water is 75° F.

It sometimes happens that a grain of sand, or other particle enters the oyster's home, which, for some reason, cannot be ejected. This irritates the oyster, which begins coating this particle with the same substance with which it coats the inside of its shell. As the coating process continues there emerges a pearl, one of which you may have found when eating an oyster stew.

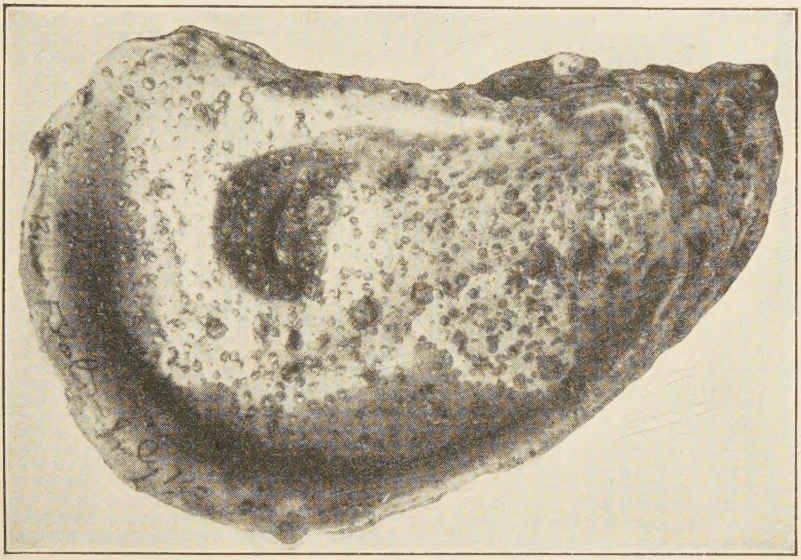

FIGURE 5.—Oyster spat attached to oyster shell.

Sometimes shucked fresh oysters, when purchased at the retail store, have in them a little red crab, called an oyster crab, about the size of a man's little finger nail, which has entered the shell of the oyster for protection and lives there in perfect harmony with the oyster. These crabs are entirely edible.

Oyster Culture

A very important branch of the oyster industry is engaged in the culture of oysters. In some cases this may be restricted to the culture of spat for seed oysters; in others the raising of transplanted seed oysters to oysters of marketable size; and in still others both the culture of seed oysters and raising of marketable oysters from this seed. By improved methods of oyster culture greater quantities of spat have been collected than formerly was believed possible, depleted beds and barren areas have been restocked with oysters, and large areas in deep water beyond the natural range of the oyster have been brought into cultivation thereby adding to our oyster-farming acreage. The culture of oysters much resembles the sowing, cultivating, and harvesting of a cereal such as wheat. For this reason the oyster

culturist has come to be known as an oyster farmer. While a form of oyster culture was practiced by the Chinese at a remote period, by the Romans about 100 B. C.,[12] and later by early Europeans, the greatest advances in this science have been made in comparatively recent years in the United States.

Imagine, if you will, that you controlled a body of water of about 50 to 100 acres located along the seashore in a bay or inlet, or in the open ocean along the shore. The bottom of this will be your oyster "farm." It may be entirely covered with water at all times as along the North Atlantic, where it may be under 6 to 30 feet or more of water. If along the South Atlantic or Gulf coast, it may be confined

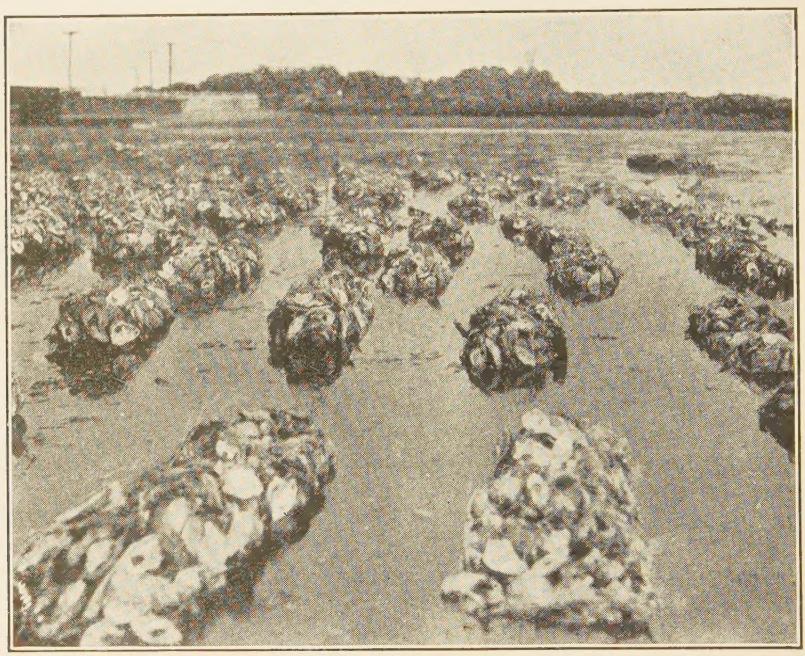

FIGURE 6.—Showing method of laying out oyster shells in wire bags on tide flats for collection of oyster spat.

to a relatively narrow space between high- and low-tide levels, and seldom more than 2 or 3 feet below water level.[13] Along the Pacific coast your farm may be entirely exposed at low tide.

For best purposes your farm should be under water which will reach a temperature of about 70° F. in the summer and somewhere relatively near the shore line where it will have the influence of fresh water from streams. The oyster does not thrive in waters of the maximum salinity of the ocean nor will it grow in strictly fresh water. However, our bays and sounds furnish an ideal habitat for it. The fresh water entering from the many rivers and streams lowers the salt content of the water over the bed, making it favorable

[12] Oysters: A leading fishery product, by Hugh M. Smith, in Book of Fishes, National Geographic Society, Washington, 1924.

[13] Factors influencing the spawning and setting of oysters in Galveston Bay, Tex., by A. E. Hopkins. Bulletin No. 3, U. S. Bureau of Fisheries, Washington, 1931.

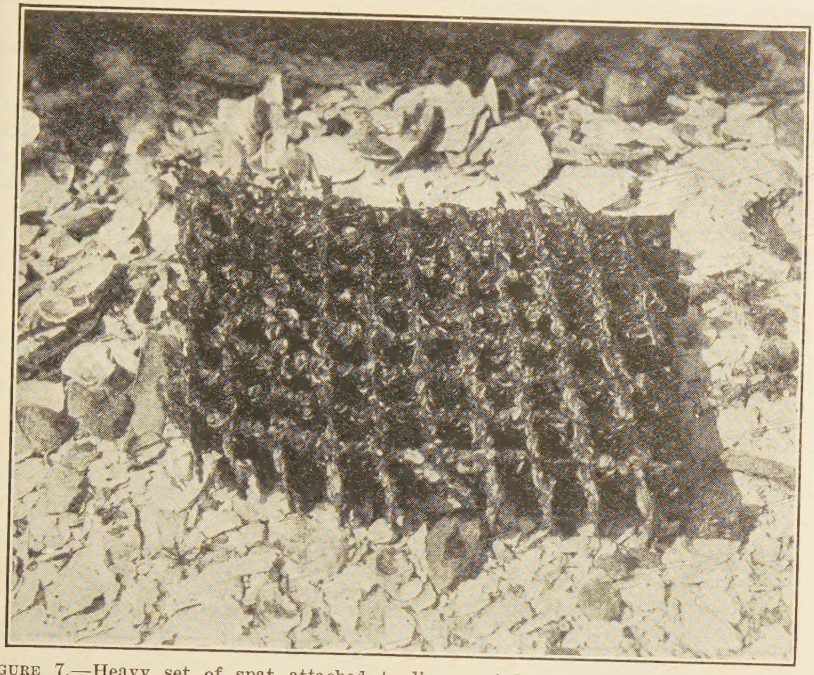

FIGURE 7.—Heavy set of spat attached to lime coated cardboard egg-crate partition.

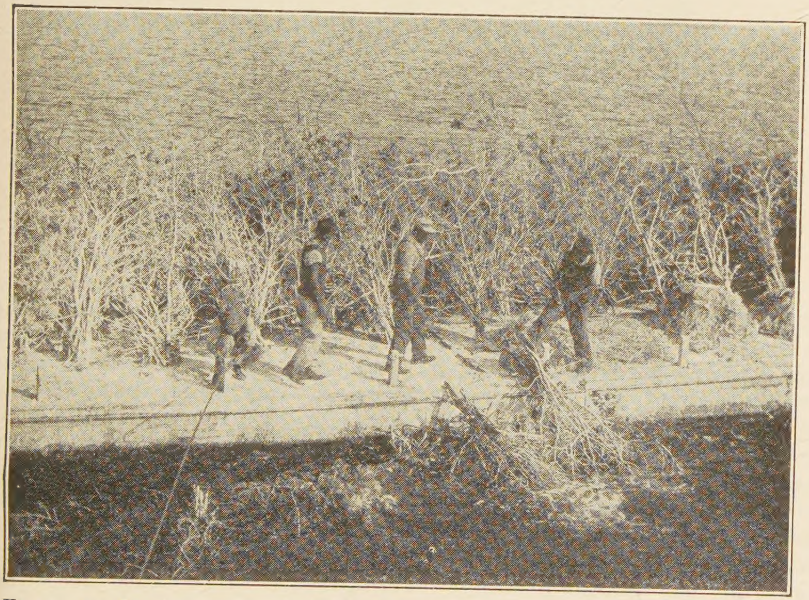

FIGURE 8.—Planting cement-coated brush over oyster bed to collect oyster spat.

for the growth of the oysters. These streams also carry food and minerals to the oyster.

The "bed" or bottom of your farm should be composed of hard mud or gravel, a bottom of oyster shells being one of the best, so that the oysters will not sink and be smothered. Silt-laden waters are not conducive to the production of seed oysters, as objects become covered with the silt, thereby making it difficult for the spat to find a clean surface upon which to attach themselves. Such water, how-

FIGURE 9.—Growth of young oysters attached to lime-coated twig.

ever, ofttimes is very satisfactory for the rapid growth of oysters, as it is usually more productive of food organisms. It was early recognized that some beds are best for producing seed oysters and others best for growing or fattening oysters. It was found that a change of residence sometimes is beneficial to the oyster. In Roman times it was the practice to transplant Brundisian oysters to Lake Lucrinus to improve their flavor.[14]

Oyster farming is carried on by individuals who may cultivate a few acres of bottom, by corporations which operate thousands of acres of water area, and by State governments which conduct operations on the public grounds. The private farms may be owned

[14] Fishing from earliest times, by William Radcliffe. Published by John Murray, London.

outright in some States much like any other piece of real estate, or they may be leased from the State at a nominal rental. The conduct of operations on the farm is more or less subject to State regulation. In some localities there are public oyster beds or "rocks" which belong to the State and upon which any oysterman may operate under various State regulations. One of the most famous public oyster "grounds" or "rocks" is in Tangier Sound in Chesapeake Bay. Normally, the production of the private oyster farms in the United States is about equal to that of the public beds.

Oyster farming offers a solution for maintaining an adequate supply of marketable oysters and for restoring production to former levels, thus creating additional national wealth.

FIGURE 10.—Oyster reef in Georgia at low tide.

Oyster Enemies [15]

In the free-swimming stage the oyster larvae is a favorite food of many aquatic forms, including other oysters. After the spat is securely anchored to an object and the oyster begins to build a limestone shell about itself, it is attacked by a host of enemies and is beset with many unfavorable conditions. Even after building its armor of limestone it is not safe. In later stages of development aquatic creatures armed with drills, suction pumps, crushers, and other implements of warfare, prey upon the oyster. One type of snail found in the Middle Atlantic area drills a hole through the shell of the oyster with its rasplike "tongue" and then inserts its

[15] Based on the following publication: The oyster and the oyster industry of the Atlantic and Gulf coasts, by E. P. Churchill, Jr., Fisheries Document No. 890, U. S. Bureau of Fisheries, Washington, 1920; Studies on the oyster drill, by Henry Federighi, Bulletin No. 4, U. S. Bureau of Fisheries, Washington, 1931; and Destruction of oyster bottoms in Mobile Bay in the flood of 1929, by Paul S. Galtsoff, Fisheries Document No. 1069, U. S. Bureau of Fisheries, Washington, 1930.

proboscis into the hole and devours the oyster meat. Around Long Island Sound the starfish attaches itself to the lip of the oyster, exerts pressure on the shell with its suckers, and secretes a fluid which narcotizes the oyster. Having done this, it inserts its stomach between the shells by practically turning that organ inside out, and feeds on the meat inside. In certain sections along the Gulf coast a

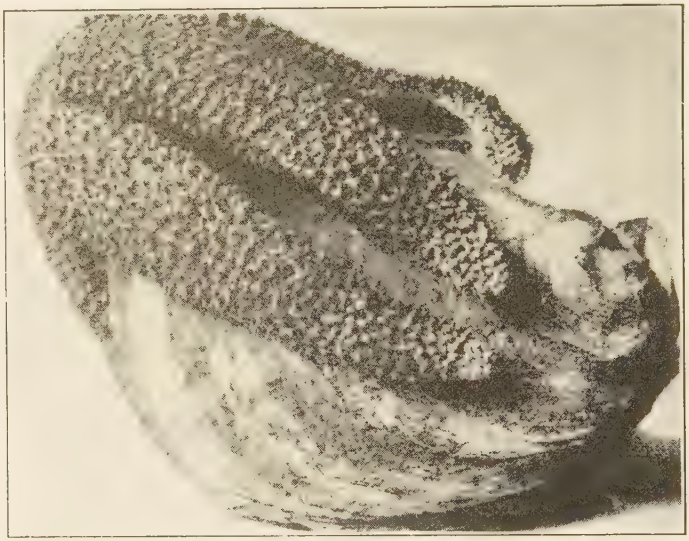

FIGURE 11.—Starfish attacking an oyster. (Photograph by Hugh M. Smith.)

FIGURE 12.—Mop used for catching starfish. It is dragged over oyster bed and starfish become entangled in the strands of the mop. The mop is then brought aboard boat and the entangled starfish are destroyed.

wafer leech succeeds in entering the shell of the oyster when open and then feeds upon the meat. The black drum found along the South Atlantic coast crushes the oyster shell between the bony plates in the back of the mouth (like stone crushers) and then devours the meat. Other enemies of the oyster are conchs, mussels, boring sponges, and boring clams. All of these enemies are a menace to the growth and survival of oysters, causing heavy losses each year. Various methods have been developed to eradicate some of these pests, and these methods are now being used commercially toward their destruction.

The elements of nature sometimes combine to destroy whole beds of oysters. In the springtime freshets carry large quantities of fresh water over the beds. This lowers the saltiness of the water, often proving fatal to the oysters in the vicinity. Freshets also scatter large volumes of mud and silt over the beds, the debris depriving the oysters of air and destroying large quantities of them. Man also has been responsible for depleting our oyster resources by overfishing the beds. In addition, municipal and trade wastes have polluted the water over some beds so that the oysters on them have been made unfit for use, and in some cases the oysters have been killed.

The Oyster Fishery and Industry

The oyster fishery of the United States is one of our few fisheries which has been prosecuted continuously since early Colonial times. As mentioned previously, it was conducted by the Indians, later by the colonists, and to this day it forms our second most valuable fishery in point of income to the fisherman, and the first from the standpoint of employment in the fisheries. It has been the dominating factor in the settlement of towns and the rise of many of these to thriving industrial communities. In many of these the oyster fishery still is the principal source of livelihood for the people. It has been estimated that about 60,000 persons are gainfully employed in the various branches of the industry as fishermen, oyster shuckers, packers, and at other tasks. The industry is based principally on three species—the Atlantic oyster, the Olympia oyster, and the Japanese oyster grown on the Pacific coast from seed imported from Japan.

Let us visit a typical oyster fishery in Chesapeake Bay and see how it is conducted.

It is the middle of August, the temperature is about 90° in the shade, and we are walking along the water front of a town on the shore of Chesapeake Bay. The oyster season is just a month away, but the oystermen already are preparing for it. Here we see a group of men overhauling a sailboat on a marine railway. Over there is a man, who we are sure has sailed on many a rough sea, painting the little motor boat which he will use next month in tonging for oysters. Across the channel we see a crew of men putting a white coat of paint on the inside and outside of a small, concrete building—the oyster-shucking house in September. Turning back toward the business section of the town we pass by a building in which many workers are fabricating tin cans which later will be used for shucked oysters. Nearby we hear the clang of hammers, and upon investiga-

tion find blacksmiths making oyster dredges, tongs, and rakes. The ice plant in the other part of town is working overtime to have sufficient ice to start the oyster season. A factory is making wooden boxes and barrels in which to ship the oysters to market. Down at the depot a string of refrigerated freight cars is on the siding waiting to haul the shipments of oysters to all parts of the United States.

In September the scene has changed. The oyster season has started, people are calling for oysters, and the industry is making every effort to supply them. The sailboats have been dragging dredges over the bottom out in the bay and pulling the oysters on board, and the individual oysterman has been using his tongs in more shallow water to nip oysters off the "rocks."

FIGURE 13.—Oyster fleet in Baltimore, early days of the industry.

The dredge, a metal frame with teeth along its base, behind which is attached a bag made of chain rings or rope, is drawn along the bottom behind a fishing boat and the oysters scraped into the bag. After dragging a certain length of time the bag is drawn aboard, usually by the aid of a power winch, and emptied on deck. In some sections a dredge may take 40 to 50 bushels during a day from natural beds, while in other sections on private oyster farms vessels operating two dredges have a capacity of 1,000 to 5,000 bushels a day.

Tongs are a scissorlike appliance, consisting of two long poles with a toothed bar about a yard wide on one end of each. These poles are riveted together about one-third of the distance from the toothed bar to the end of the pole. By alternately opening and closing the tongs the teeth dislodge the oysters, which are caught in the basket that is formed when the poles are pulled together, and they are then

FIGURE 14.—One type of sailing vessel used for oyster dredging on natural beds in Delaware.

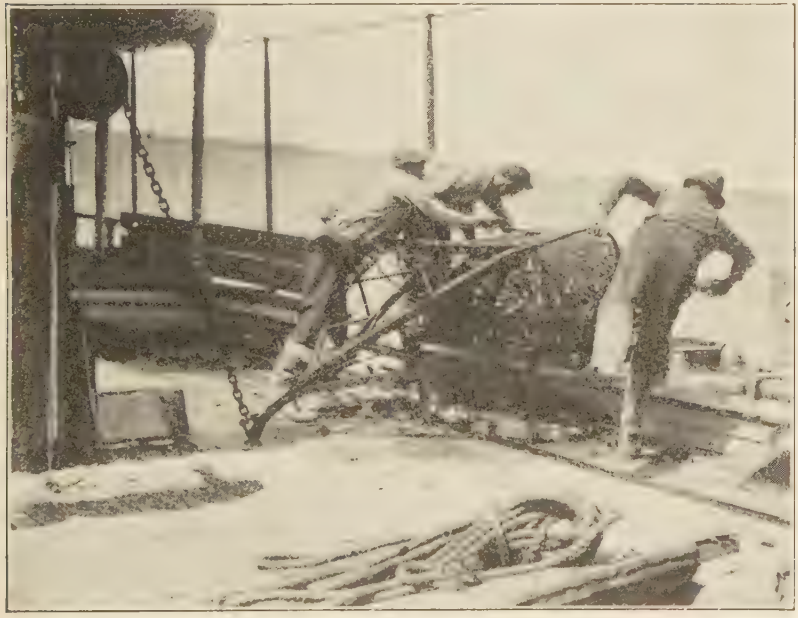

FIGURE 15.—Bringing oyster dredge aboard vessel with bag full of oysters.

raised to the deck of the boat and unloaded. During the course of a day an individual tonger may take 7 or 8 bushels.

The various States usually have a minimum size for the oysters taken from public beds. Hence once on board the boat the oysters are culled, those undersized being returned to the water to mature.

After capture the oysters are delivered to the shucking plant, where they are opened, the meats extracted, and then washed. The washed fresh oysters are graded as to size and quickly placed in cans, which are immediately iced. For shipment the cans of fresh oysters are packed in boxes and barrels with crushed ice and rushed to market by refrigerated express.

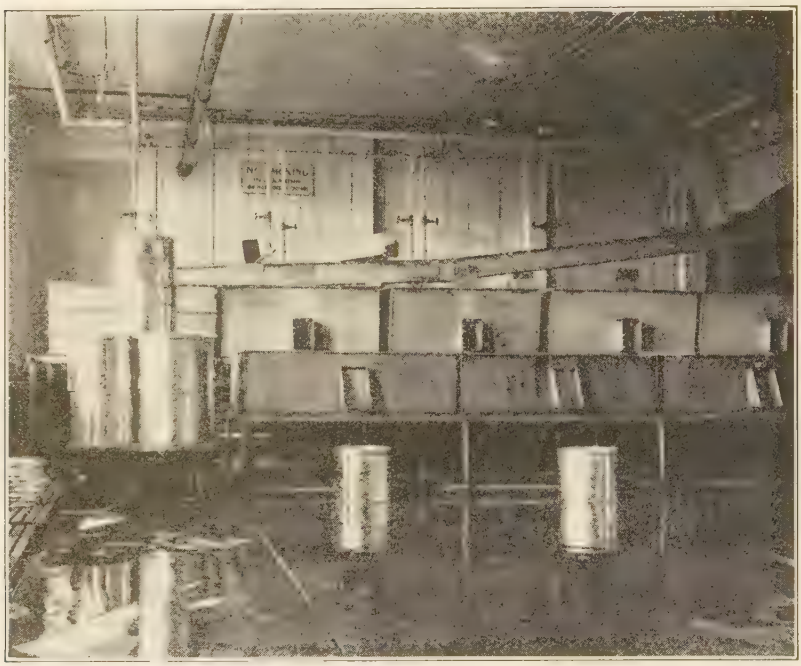

FIGURE 16.—Tanks for washing shucked oyster meats.

The fresh oyster can be eaten raw, or it may be used for stews and soups, for frying and scalloping, and in many other ways. During 1933, about 50,000,000 pounds of shucked oysters valued at $7,000,000 to shucking firms were marketed in the United States.[16]

Shucked fresh oysters are available for purchase in retail stores in pint or quart and other sizes of tin cans or in bulk in waterproof paper buckets.

Many oysters are marketed alive in the shell. These are usually packed in boxes and barrels and shipped to market with or without ice, depending upon weather conditions and the distance of shipment. These are the type of oysters one obtains in a restaurant when ordering oysters on the half-shell or at oyster roasts and barbecues.

[16] Fishery Industries of the U. S., 1934, by R. H. Fiedler. Appendix II, Report Commissioner of Fisheries, 1935, pp. 75–330. Washington, 1935.

Many bushels are shipped abroad each year to supply the taste of Europeans, who are fond of our American shell oysters. This trade had its beginning in 1861.[17]

Considerable quantities of eastern shell oysters are shipped to the Pacific coast for consumption there. Some of these are replanted in suitable areas pending sale.

A considerable portion of our oyster harvest is canned, the usual canning process consisting of steaming the oysters to open the shell and then removing the meats. After washing, the meats are placed

FIGURE 17.—Live oysters in metal cars preparatory to steaming to open shells.

in the can and processed with heat. In 1933 about 5,200,000 pounds of oysters, valued at $1,000,000 to canners,[18] were packed in this manner.

Oysters were among the first foods canned in this country, the first cannery being opened in Baltimore in 1844.[19] For many years this continued to be the center of the industry, but in late years Mississippi and Louisiana have become the principal States for this business. Recently, an oyster-canning business started in the State of Washington, the canneries in this State using oysters grown from seed imported from Japan. This type of oyster grows very rapidly, sometimes reaching maturity in 12 to 18 months.

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[17] Preservation of fishery products for food, by Charles H. Stevenson from U. S. Fish Commission Bulletin for 1898, Washington, 1899.

[18] Fishery Industries of the U. S., 1934, by R. H. Fiedler. Appendix II, Report Commissioner of Fisheries, 1935. Washington, 1935.

[19] Preservation of fishery products for food, by Charles H. Stevenson, from U. S. Fish Commission Bulletin for 1898, Washington, 1899.

Canned oysters are cooked for the table much like the fresh-shucked oysters and are available for purchase in tin cans of the following capacities: 4-, 5-, 7½-, 8-, 10-, and 16-ounce.

Some shucked oysters are frozen by a special process and held in cold storage to be available for use in the summertime when the oyster season is closed. They are ideal as a summer food, for they can be eaten raw. While but a few frozen oysters are consumed at present, it is expected that larger quantities will be eaten in the future.

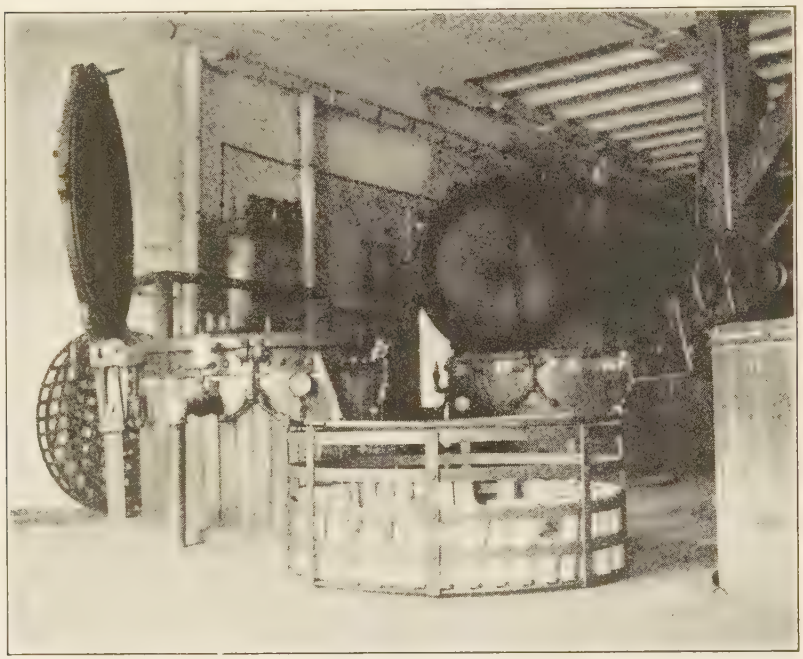

FIGURE 18.—Retorts for cooking canned oysters.

From time to time oysters have been marketed in a variety of other ways, although they are of little importance today.[20] At one time Chinese on the coast of Louisiana dried oysters for market. During the latter years of the last century some oysters were pickled and sold in New York City where the consumption was especially large during the Christmas holidays. Recently, oyster puree, soups, and chowders have been introduced to the trade and considerable quantities have been marketed. Oyster powder also is a new product.

The shells find a variety of uses. As they are an ideal object for the collection of oyster spat, many tons of them are returned each year to the oyster beds. In tidewater areas many fine roads have been built of oyster shells. Some shells are burned for their lime

[20] Preservation of fishery products for food, by Charles H. Stevenson, from U. S. Fish Commission Bulletin for 1898, Washington, 1899.

FIGURE 19.—Oyster shell pile. These later will be used for returning to beds as spat collectors, for grinding into poultry feed, or for lime.

FIGURE 20.—Use of oyster shells for building a road.

content, and large quantities of them are ground and used for poultry feed.

The oyster season extends from September to April, inclusive. These months in most tidewater sections constitute the slack season on farms and in some other lines. Thus we find many oyster fishermen and others in the industry operate small dirt farms during the summer months of the year. In some areas, like Chesapeake Bay, the fishermen may engage in the crab or other summer fisheries.

The custom that oysters should not be eaten in any month whose name lacks an "r" probably dates back to medieval times. At least there is an old Latin phrase, "Mensibus erratis vos ostrea manducatis",[21] meaning "Oysters should be eaten only in certain months" which would indicate that they were seasonal with the Romans. Notwithstanding this custom, oysters harvested during the summer months are entirely edible, and many people living along the seacoast eat them at this time of the year. Their nonuse during the summer in early times, no doubt, was due to the fact that it was somewhat difficult to transport fresh oysters far from production centers at this time of year and, further, to the fact that oysters taken from many localities are not as solid and plump in the summer since this is the spawning season. As related previously, a summer demand for fresh oysters may soon be met by marketing oysters that are caught and frozen during the winter months.

Sanitary Regulations

It is doubtful whether any food product in this country is subject to more stringent sanitary regulations than the oyster. The beds from which oysters are taken for market are subjected to sanitary examinations by the health authorities of the various States in which oysters are produced. If the bed meets certain bacteriological and chemical standards of purity, a certificate is issued to the oyster growers by appropriate State authorities.[22]

After the oyster has been extracted from the shell it again is subjected to rigid bacteriological examination and must pass certain standards of purity.[23] Further, employees engaged in handling fresh oysters at the shucking plant are required to pass periodic medical examinations and any found suffering from contagious diseases are prohibited from engaging in this type of work. The shucking plant and its physical equipment also are given periodic examinations by various municipal and State health authorities.

The United States Public Health Service issues a list of certified shippers based on the adequacy of State inspection as determined by this service.

By and large, improved sanitary conditions in the industry have resulted in the marketing of a food product which is as pure as modern science can deliver to the consumer. It is a food which can be eaten raw or cooked, and is one of the few foods of animal origin which can be eaten in its entirety.

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[21] Fishing from the earliest times, by William Radcliffe. Published by John Murray. London, 1921.

[22] Experimental study of the function of oyster gills and its bearing on the problems of oyster culture and sanitary control of the oyster industry, by Paul S. Galtsoff. Fisheries Document No. 1035, U. S. Bureau of Fisheries, 1928.

[23] Ibid.

Food Value of Oysters

When foods were eaten primarily because of their taste appeal, oysters occupied a foremost rank. Later, when the medical profession showed the way to health by the proper selection of foods for a balanced diet, the oyster not only continued to occupy a foremost rank, but in certain nutritional respects led the procession. This is especially true because of the mineral content of the oyster, which no doubt imparts to it that peculiar tasty flavor. Biochemical studies have shown that oysters contain appreciable quantities of all the minerals needed for the functioning of a healthy body.[24]

It is only natural that the oyster should have such a high content of minerals, including among others, iron, copper, and iodine. It lives and grows in the sea where it is bathed by an environment which is all-sufficient with respect to the growth of living organisms.[25] Here the water is continually augmented by material brought to it by streams from the land, by springs from below the ocean floor, and by volcanic eruptions. This material goes through a huge mixing process by the action of tides, currents, and storms, and finally evolves in a form which is easily assimilated by aquatic forms.

One pint of oysters will supply about one-half of the phosphorus, one-third of the calcium, and all of the iron [26] and iodine [27] required in the food of an average person daily. The human diet is commonly found to be deficient in the latter three minerals,[28] the last of which is needed in organic combination in the foods that we eat for the normal functioning of the thyroid gland. The high iodine content of oysters should be of special interest to residents of certain States around the Great Lakes and in the Northwest where goiter is prevalent, since the soil and water in these States are more or less deficient in iodine. In this connection it is interesting to note that the per capita consumption of fresh oysters in St. Paul, Minn.—which is the goiter belt—was highest of any city surveyed in a recent study of the consumption of fresh oysters in certain cities of the United States.[29]

The high iron, copper, and manganese content of oysters makes them valuable for promoting a rich red color in the blood, especially since these minerals in the oyster are in a form easily available for assimilation by the human body. A diet deficient in these minerals causes the blood to turn pale in color, producing a disorder called "nutritional anemia." [30]

The calcium and phosphorus in oysters make them an important food to develop straight, sturdy bones. Parents are familiar with the childhood disease called "rickets" which is caused by diet deficient in calcium.

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[24] Studies on the nutritive value of oysters, by E. J. Coulson. Fishing Gazette, vol. 50, no. 9, August 1933. New York, N. Y.

[25] The nutritional value of oysters and other sea food, by D. Breese Jones, American Journal of Public Health, December 1926. New York, N. Y.

[26] Food values: How foods meet body needs, by E. A. Winslow. U. S. Department of Agriculture Bulletin No. 975, Washington, 1921.

[27] The iodine content of oysters, by E. J. Coulson. Investigational Report No. 18, U. S. Bureau of Fisheries, Washington, 1934.

[28] Ibid.

[29] Market for fresh oysters in fourteen cities of the United States, by J. M. Lemon, Fishery Circular No. 3, U. S. Bureau of Fisheries, Washington, 1931.

[30] Studies on the nutritive value of oysters, by E. J. Coulson. Fishing Gazette, vol. 50, no. 9, August 1933. New York, N. Y.

While the oyster is a most important food from the standpoint of its mineral content, it also is important nutritionally from the standpoint of its protein and vitamin content. One pint of oysters will furnish about one-fourth of the protein required by a man daily.[31] Protein is needed in our diet for normal growth and maintenance of life.

The oyster also contains vitamins A, B, C, D, and G in appreciable quantities.[32] Vitamin A is needed in the diet to prevent an eye disease; vitamin B, beriberi; vitamin C, scurvy; vitamin D, rickets; and vitamin G prevents pellagra. It, therefore, is important that our diet contain these vitamins for the normal functioning of a healthy body.

Glycogen, a substance resembling starch, is another important constituent of oysters, and is necessary in the diet of healthy individuals. As contained in the oyster, it is practically predigested and ready to meet nutritional requirements of the body even when uncooked.[33]

The oyster is more nearly balanced nutritionally than possibly any other single food—resembling milk in this respect. It needs only starches and fats to make it a completely rounded food from a nutritional standpoint and these ingredients are ordinarily used in cooking.[34]

When cooked with milk, as in a delicious oyster stew, we can be sure that this combination is a most healthful one, for it permits the formation of rich red blood and good growth, reproduction, and lactation.[35]

Previously it was mentioned that the oyster is not mobile after attachment of the spat to an object. Attached thus, it feeds on food particles in the water passing through its gills when the shell is open. Therefore, about the only strenuous exercise required of the oyster is that necessary to open and close its shell. No doubt this more or less inactive life of the oyster has resulted in producing a product practically devoid of muscular tissue, thereby earning for itself a reputation for being a tender food.

Because of its many nutritive constituents, the oyster is an ideal food for those in practically any walk of life, whether a homemaker, office worker, laborer, invalid, or growing child. It is a food that can be served raw on the half shell and as a cocktail, or in soups, sandwiches, salads, or as the main course of a meal. Also the oyster can be eaten during any month of the year and for any meal of the day.[36]

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[31] Studies on the nutritive value of oysters, by E. J. Coulson. Fishing Gazette, vol. 50, no. 9, August 1933. New York, N. Y.

[32] The nutritional value of oysters and other sea food, by D. Breese Jones, American Journal of Public Health, December 1926, New York, N. Y.; A study of the vitamin content of mollusca: The presence of Vitamin C in the oyster; Compt. rend. Acad. d. Sc. (Paris), 177: 498, 1923, Experiment Station Record, 1, 465, 1923; Vitamins A, D, and B in oysters—effect of cooking upon vitamins A and B, by Dorothy V. Whipple, Journal of Nutrition, February 1935, Philadelphia; and The oyster—Modern science comes to the support of an ancient food, by H. D. Pease, Journal of Chemical Education, October 1932.

[33] Market for fresh oysters in fourteen cities of the United States, by J. M. Lemon. Fishery Circular No. 3, U. S. Bureau of Fisheries, Washington, 1931.

[34] Oysters: A little of their history and how to cook them, by H. F. Moore. Economic Circular No. 18, revised, U. S. Bureau of Fisheries, Washington, about 1920.

[35] Studies on the nutritive value of oysters, by E. J. Coulson. Fishing Gazette, vol. 50, no. 9, August 1933. New York, N. Y.

[36] In some cities such as Chicago, Ill., Oklahoma City, Okla., and Baltimore, Md., they are eaten extensively at breakfast. See "Market for fresh oysters in fourteen cities of the United States", by J. M. Lemon. Fishery Circular No. 3, U. S. Bureau of Fisheries, Washington, 1931.

Further, the oyster is an economical food. It is entirely edible, there being no wastage from trimmings. In fact, when you buy a quart of oysters you buy a quart of food. In addition oysters can be prepared for the table by the use of simple and inexpensive ingredients, which is an item worth considering in household economy.

With its wide variety of uses, many recipes have been developed for serving oysters, 35 of which are given in the following pages.

FIGURE 21.—A serving of raw oysters on the half shell. (Courtesy, Oyster Institute of North America.)

Recipes [37]

As used in the recipes, lbs.=pounds, C.=cup, qt.=quart, pt.=pint, tbsp.=tablespoon, and tsp.=teaspoon. All measurements are level.

1. Sauce for Raw Oysters

2 tsp. tarragon vinegar
2 tbsp. olive oil
½ tsp. Worcestershire sauce
1 tbsp. grated onion
½ lemon (juice)
½ tsp. tabasco sauce
2 tsp. horseradish
2 tsp. sugar
¼ tsp. salt

Stir well, chill, and serve on cocktail oysters. Garnish with paprika.

[37] Recipes nos. 1, 2, 9, 10, 11, 12, 13, 16, 20, 25, 29, 31, and 32 were tested or developed by Agnes I. Webster, home economist of the U. S. Bureau of Fisheries, in its fish-cookery laboratory, Washington, D. C.; recipes nos. 3, 4, 5, 6, 7, 8, 14, 15, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, and 30 are taken from "Oysters: A little of their history and how to cook them", by H. F. Moore, U. S. Bureau of Fisheries, Economic Circular No. 18 (revised), and "Oysters: An important health food", by Lewis Radcliffe, U. S. Bureau of Fisheries, Economic Circular No. 58; recipes nos. 33 and 34 are taken from "Practical fish cookery", by Agnes I. Webster and W. T. Conn, U. S. Bureau of Fisheries, Fishery Circular No. 19; and recipe no. 35 was furnished by courtesy of John R. Schacht, Philadelphia, Pa.

2. Oyster Cocktail

This is an individual serving.

6 small oysters
2 tsp. lemon juice
1 tsp. Worcestershire sauce
2 tbsp. tomato catsup
Dash tabasco sauce
1 tbsp. horseradish
⅛ tsp. salt
½ tsp. sugar

Combine thoroughly and serve ice cold.

3. Oyster Soup

1 qt. oysters
1 pt. water
Salt
Pepper
1 qt. milk
1 tbsp. butter
Mace
Cracker crumbs

Put milk, water, and seasoning in a saucepan and heat. When the mixture boils, add the oysters and simmer for 5 minutes. Thicken with cracker crumbs.

4. Stewed Oysters

1 pt. oysters
1 pt. milk
Salt
2 tbsp. butter
Pepper

In a saucepan, combine the milk, butter, and seasoning. Let come to a boil, then add the oysters and boil for a few seconds until the oysters are plump and ruffled.

5. Broiled Oysters on Toast

1 pt. oysters
1 tsp. grated onion
Salt
Parsley
½ C. cream
Little lemon juice
Dash tabasco sauce
Buttered toast

Broil the oysters lightly on gridiron. Place them on thin slices of toast and pour over them a sauce made of the cream, onion, lemon juice, salt, and tabasco sauce. Serve hot, garnishing with parsley.

6. Fancy Roasted Oysters

1 pt. oysters
1 C. water
Salt
Butter
Parsley
Pepper
Slices of bread, buttered

In a saucepan, heat the water, salt, pepper, and lump of butter. When the mixture comes to a boil, add the oysters. Have the buttered bread ready in a hot shallow dish; as soon as the oysters come to the boiling point, pour the whole over the bread and serve at once. Garnish with parsley.

7. Pigs in Blanket

12 oysters
Paprika
12 thin slices of bacon
Chopped parsley

Drain oysters and dry each in a napkin. Wrap each with a slice of bacon secured in place by a wooden toothpick. Sprinkle each with paprika and chopped parsley, and brown slowly in oven. Serve very hot.

8. Bacon and Oysters (Plain)

12 large oysters
12 thin slices of bacon

Drain oysters and dry each in a napkin. Wrap each with a slice of bacon secured in place by a wooden toothpick. Bake in a moderate oven to a rich brown. Serve hot.

9. Baked Oysters with Cheese

1 pt. oysters
1 C. cream
1 tsp. anchovy extract
¼ tsp. salt (more if desired)
¼ tsp. pepper
2 tbsp. butter
Crumbs
Grated snappy cheese

Put butter into saucepan with cream and stir over fire until hot; then add anchovy extract, salt, and pepper. Put some of this mixture into a small buttered baking dish and lay oysters on it, sprinkle with crumbs and lightly with snappy cheese. Repeat until oysters are used. Pour remainder of sauce over the top, sprinkle with bread crumbs and cheese. Bake in brisk oven until nicely browned.

10. Baked Oysters, Potpourri

16 to 20 oysters
2 tbsp. chopped shallots
2 tbsp. chopped chives
2 tbsp. chopped parsley
¼ C. chopped mushrooms
¼ tsp. salt
¼ tsp. pepper
2 tbsp. butter
Crumbs

Melt butter, add all ingredients but the crumbs, let fry slowly 5 minutes. Place a single layer of oysters in a greased baking dish. Sprinkle over them the butter mixture. Top with crumbs and bake in hot oven, 450° F., 6 to 10 minutes. Serve at once.

11. Spicy Baked Oysters

16 oysters
1 tbsp. catsup
½ tsp. Worcestershire sauce
1 tsp. lemon juice
2 tbsp. butter
¼ tsp. pepper
¼ tsp. salt
1 tbsp. mustard paste
½ tsp. sugar
Grated cheese

Place oyster meats on the deep shell on a pan or a single layer in a baking dish. Melt butter and add all ingredients but cheese. When mixed, place a small spoonful on each oyster, sprinkle lightly with cheese grated, and bake 10 minutes in hot oven that has been preheated to 450° F.

12. Baked Oysters with Celery

1 pt. oysters
1 egg beaten with 1 tbsp. water
1 tsp. salt
⅛ tsp. red pepper
2 tbsp. butter
½ C. cream
Parsley, minced
Celery, finely minced, or grated, and cooked in the butter until tender

Dip oysters first in egg, then in bread crumbs, and lay in a greased baking dish. Sprinkle with 1 tablespoon minced parsley and freely with grated cooked celery, and so alternate remaining oysters, celery, and parsley. Combine salt, pepper, cream, and remaining egg. Pour this over the mixture. Bake 20 minutes in an oven preheated to 400° F.

13. Toasted Oyster Loaf

1 pt. oysters
⅓ C. butter
½ C. cream
2 tbsp. flour
¼ tsp. pepper
1 tsp. salt
1 loaf bread, day old

Slice bread lengthwise of loaf. Dry thoroughly and toast in oven. Then butter. Place 2 tablespoons butter in sauce pan, add oysters, salt, and pepper. Allow oysters to plump. Mix flour with small amount of water, add with cream to the oyster mixture. Stir until thickened. Place bottom crust on oven platter, spread with oyster mixture, then a slice of bread, a layer of oysters. Place on the top crust, cover with oyster mixture. Put in an oven preheated to 450° F. Bake until thoroughly heated. Serve at once.

14. Panned Oysters

1 pt. oysters
½ C. cream
Cayenne pepper
2 tbsp. butter
Salt

Heat the butter in a saucepan and add the oysters. When the edges of the oysters begin to curl, add the cream, salt, and cayenne.

15. Panned Oysters on Toast

1 pt. oysters, washed and drained
1 tbsp. butter
Salt
Pepper

Put the butter into a covered saucepan and add desired salt and pepper. When hot, add the oysters and cook for 3 minutes or until plump, keeping the pan covered and shaking it to prevent the oysters from sticking. Serve on toasted bread or crackers.

16. Sherried Oysters on Toast

1 pt. oysters
1 C. cream
Sherry, to suit taste
¼ C. butter
¼ tsp. salt, if desired

Pick over and dry oysters on towel. Have gridiron hot, add single layer of oysters; when brown on under side turn, let brown and plump until edges curl. Remove oysters to pieces of crisp hot toast. Repeat until all oysters are cooked. The liquor from oysters will have browned on pan. Add butter, salt, and cream, stirring to dissolve the browned oyster liquor. When dissolved, remove from fire, add sherry to taste, and serve at once on oysters and toast.

17. Fried Oysters

Oysters
Eggs
Fine cracker dust
Salt
Cooking oil (or substitute) with a little butter added

Select the largest oysters, rinse quickly, and lay carefully on a colander to drain. Dry quickly and gently with a soft cloth, handling as little as possible. Take a steel fork and catch it in the "eye" of the oyster, dip in egg, and then in fine cracker dust, being careful not to use too much cracker dust, as it tends to disguise the flavor of the oyster. Use 2 eggs for each 1½ dozen oysters. Beat

them, add a pinch of salt and a tablespoonful of boiling water. Have ready a frying pan, not too deep, with plenty of smoking-hot cooking oil (olive oil, sweet lard, etc.), to which add a little butter to aid in making the oysters crisp and brown. Put in only enough oysters to cover the bottom without crowding. When brown on one side, turn over.

18. Grilled Oysters

1 pt. large oysters
Flour
Salt
Parsley
Butter
Worcestershire sauce
Cayenne pepper
Toast

Put a large piece of butter into a hot pan, and when it smokes drop in the oysters, a few at a time. When the oysters are browned, remove to a hot dish and pour over them a sauce made of melted butter thickened with flour. Season with Worcestershire sauce, salt, and cayenne, and serve on toast. Garnish with parsley.

19. Oyster Pie

1 pt. oysters
1 tsp. finely chopped bacon
Salt
Pie-crust dough
Butter
Pepper

Line a baking dish with the dough, add oysters, a little butter, and the bacon. Season, put on a top crust of dough, and bake for three-quarters of an hour.

20. Beefsteak and Oyster Pie

1 pt. oysters
1 lb. beefsteak
⅔ c. flour
2 tsp. salt
¼ tsp. pepper
¼ tsp. garlic salt or 1 small clove garlic, minced fine
¾ tsp. celery salt
½ tsp. onion salt or 2 tsp. onion, finely minced
½ tsp. mustard, dry ground

Pick over oysters and drain from liquor. Mix the seasonings with the flour and pound into the steak. Try out the suet in skillet. Just before smoking point, put in steak, sear on both sides, lower the flame, just cover with water, and simmer until tender. Add more water if needed while cooking. Then cut in small pieces. Add oysters, mix well, and pour into baking dish. Cover with a flaky pastry or dot the top with small thin rich biscuits. Bake in preheated oven 425° for 15 to 25 minutes. Serve at once.

21. Scalloped Oysters

1 qt. oysters and their liquor
Dry bread or cracker crumbs
Milk
Salt
Pepper
Butter

Take 1 quart of oysters, put in layers in baking dish, alternating with dry bread or cracker crumbs, and season to taste. When dish is filled, add strained oyster liquor and sufficient milk to moisten. Cover top with crumbs and tablespoonful butter in bits. Bake ½ hour in hot oven.

22. Oysters in Potato

12 oysters
Chopped parsley
Salt
Butter
Cracker crumbs
4 medium-sized potatoes
Beaten egg
Pepper
Cooking fat

Boil the potatoes until done, mash and season with salt, pepper, butter, and a little parsley. Scald the oysters in their liquor then drain. Take up enough potato to be about the size of an egg when rolled, make cavity in one end, insert oyster, fill in cavity, dip in beaten egg, roll in cracker crumbs, and fry in deep fat until a golden brown. Serve while hot.

23. Oyster Paddies

Oysters
1 beaten egg
Minced onion
2 C. mashed potatoes
Chopped parsley

Form cakes with the mashed potatoes, beaten egg, and minced onion. Split the cakes with a sharp knife, lay 2 or 3 oysters on lower part and then replace top part. Bake in moderate oven until cakes are brown, then garnish with parsley.

24. Oyster-Potato Pie

About 50 oysters and their liquor
Butter
Salt
1 doz. medium-sized potatoes
Chopped parsley
Pepper

Separate the oysters from their liquor. Boil potatoes and mash them, adding butter and the oyster liquor. In a baking dish place a layer of mashed potatoes and then a layer of oysters. Sprinkle with parsley and season. Repeat until dish is filled, a layer of the potato being on top. Bake in a hot oven for a few minutes until brown.

25. Oysters with Tomatoes

1 pt. oysters
2 tbsp. onion, finely diced
1 C. stewed tomatoes
1 ½ tsp. salt
1 tbsp. parsley, chopped fine

Boil down tomato to half. Drain and pick over oysters. Melt butter and fry onion to golden brown. Combine tomato with butter-onion mixture. When thoroughly hot, add oysters, salt, and parsley. Cook just until edges of oysters curl. Serve at once on toast.

26. Oyster Savory with Rice

1 qt. or 1 pt. oysters
1 peeled onion
¾ C. rice.
4 tomatoes, peeled and seeded
1 green pepper, seeded
⅓ C. butter
2½ C. stock
1 tsp. salt

Plunge the pepper into boiling water, and with a towel remove the thin skin. Chop the pepper and onion fine, then cook in the butter until yellow. Put the rice in a casserole with the onion, pepper, stock, tomatoes, and salt, and stir occasionally until the rice is nearly tender. The cooking should be done in a moderate oven. Stir the oysters into the rice in the casserole and let cook about 15 minutes.

Half a dozen slices of bacon may be used instead of the butter, if desired.

27. Oysters with Egg on Toast

1 pt. oysters
Yolks of 2 eggs
Salt
Nutmeg
1 tbsp. butter
½ C. cream
Cayenne pepper
Parsley

Mince the oysters and season with salt, cayenne, and nutmeg. Melt the butter in a saucepan and stir in the minced oysters. In a separate dish, beat the egg yolks with the cream and stir into the minced oysters. As soon as the eggs set, serve on buttered toast and garnish with parsley.

28. Oysters with Anchovy Paste on Toast

1 pt. oyster meats
Butter
Pepper
French mustard
1 C. water
Cracker crumbs
Anchovy paste
Salt

Spread thin slices of toast with anchovy paste. Boil the oysters in 1 cup water for 2 minutes. Drain and season them with salt, pepper, and French mustard. Mince the oysters and spread them on the toast. Sprinkle the minced oysters with crumbs, butter lightly, and bake until golden brown on top.

29. Oysters in Cream

1 pt. oysters
2 tbsp. butter
1 C. cream
4 tbsp. fine bread crumbs
1 tsp. salt
¼ tsp. pepper

Sliced bread ¼-inch thick

Fry bread to a golden brown, in butter. Drain and pick over oysters. Melt butter, add cream, and bring to the scald. Add oysters, salt, pepper, and heat until edges of oysters curl. Just before removing from stove, scatter in the crumbs. Place fried bread in bottom of hot dish and pour oyster mixture over it. Serve at once.

30. Oyster Stuffing for Turkey or Goose

1 pt. oysters
¼ C. butter
1½ C. cracker crumbs
2 tsp. lemon juice
1 tbsp. chopped parsley
Salt
Pepper

Mix the crumbs, butter, parsley, lemon juice, and seasoning, and roll the oysters in the mixture so that each is well covered. Stuff all into the turkey or goose. If desired, the oysters may be chopped coarsely. For a large fowl, it will be necessary to increase this recipe, using the same proportions, in order to obtain sufficient stuffing.

31. Oyster and Tomato-Jelly Salad

1 pt. oysters
½ C. tomato chile sauce
4 tbsp. horseradish
¼ tsp. salt
Water to make 1 pt. of jelly
1 tbsp. gelatin softened in 4 tbsp. water

In a saucepan, place the oysters and 2 tablespoons of horseradish. Heat, stirring constantly until plumped and edges curl. Drain the

hot liquor over the softened gelatin. Add chile sauce, salt, remaining horseradish, and enough water to make 1 pint of jelly. Add the plumped oysters. Pour into one large mold or individual molds. Garnish with slices of stuffed olives and parsley. Serve with a mild mayonnaise.

32. Oyster Jelly Mold

1 pt. oysters
4 tbsp. horseradish
3 tbsp. spiced vinegar
1 tbsp. white wine
1 tsp. sugar
¼ tsp. salt
1 tbsp. gelatin softened in 4 tbsp. water
Water enough added to make 1 pt. jelly

In a saucepan, place oysters and 2 tablespoons horseradish. Heat stirring constantly until oysters plump and edges curl. Drain the hot liquor into the softened gelatin. Add salt, stir until dissolved. Then add all seasonings and plumped oysters. Pour into a mold and let set. This salad is attractive when garnished with strips of pimento and slices of stuffed olives. Serve cold.

33. Barbecued Oysters

3 doz. large oysters in the shell
½ lb. bacon, sliced thin
Bread crumbs
Paprika

Wash oyster shells thoroughly. Open oysters, discarding the flatter shell. Separate oysters from the curved shell, but allow each to remain loosely in the shell. Cover oysters with bread crumbs and season with paprika, cover each oyster with bacon, place oysters (in their shells) in one layer under a broiler flame until the bacon is cooked through. Serve oysters in the shells.

34. Oysters in Parchment

12 oysters
1 tsp. lemon juice
2 tsp. grated onion
½ tsp. salt
⅛ tsp. pepper
4 tbsp. oyster liquid
1 tbsp. grated celery
2 tsp. butter

Oil or wet the parchment paper, put in the oysters, liquid, and seasonings, bring all edges of the paper together and tie. Immerse in boiling water and let cook 5 to 8 minutes or just until the edges curl. The oysters may be served on toast and the liquid poured over them, or the liquid may be thickened and served as a sauce.

The above recipe is intended for 2 servings. For serving 6 people, 3 parchment units like the above should be prepared. They may be cooked in same kettle but the size of the unit recipe should not be enlarged.

35. Oysters and Tripe (Philadelphia Style)

1 pt. oysters
1 lb. honeycomb tripe
1 qt. milk
2 heaping tbsp. flour
2 tbsp. butter
2 egg yolks (optional)
Pepper
Salt

Place tripe cut into small squares in salted water, let come to a boil, then simmer for 1 hour or until tender. Onion and celery may be added. Melt butter, add flour, and gradually add milk and cook until smooth. Then add beaten egg yolks, oysters, and cooked tripe and cook until oysters curl.

Fish Cookery Publications

Other publications (for sale by the Superintendent of Documents) of the Bureau of Fisheries concerning the preparation of fish and shellfish are as follows:

Practical fish cookery. Fishery Circular No. 19, 5c.
Sea mussels: What they are and how to cook them. Economic Circular No. 12, 5 pp., 1 illus., 5c.
Caviar: What it is and how to prepare it. Economic Circular No. 20, 8 pp., 3 illus., 5c.
Sablefish, alias black cod. Economic Circular No. 23, 6 pp., 1 illus., 5c.
Groupers: Fishes you should try, with recipes for cooking them. Economic Circular No. 44, 8 pp., 1 illus., 5c.
Canned salmon: Pink and chum, with 44 recipes. Economic Circular No. 48, 7 pp., 5c.

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